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10/538,743	06/14/2005	Lucia Giovanola	000280.00055	5520
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/538,743

**Applicant(s)**

GIOVANOLA ET AL.

**Examiner**

LAN VINH

**Art Unit**

1792

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 and 15 is/are allowed.
- 6) ☒ Claim(s) 1-13 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5508)
- Paper No(s)/Mail Date 110205\_061405
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "said cast" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Beerling et al (US 6,592,205)

Beerling discloses a inkjet printhead comprising: a sublayer 407 of silicon , a structural layer 409 on top of said sublayer of silicon (col 4, lines 40-42, fig. 4), and a plurality of ejection chambers and of corresponding feeding ducts 413 (fig. 6) , each

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chamber containing at least one resistor 405 (col 4, lines 35-40) said structural layer being having a plurality of ejector nozzles communicating with each of said chambers and arranged facing each of said resistors (fig. 4), each of said chambers is delimited by a flat bottom wall 613 and by an upper wall made of a substantially concave surface ( fig. 6), the chambers are joined to said bottom wall along a continuous perimetral line 609 ( fig. 7), the bottom wall comprising a protective layer 613 ( fig. 6)

Regarding claim 2, Beerling discloses forming a tantalum layer 629, facing the inside of said chamber, and deposited on top of a second isolating layer 605 of silicon carbide and nitride, arranged in contact with said resistors (col 5, lines 5-15; col 7, lines 50-55; fig. 8)

Regarding claim 3, Beerling discloses that the first layer of tantalum 629 extends substantially beyond the perimetral line and constitutes the bottom wall (fig. 8)

Regarding claim 4, fig. 6 of Beerling shows a concave upper wall is joined uninterruptedly to the corresponding feeding duct, to said bottom wall and to the nozzle 401

Regarding claim 5, Beerling discloses that each of said chambers and of each of the corresponding feeding ducts has an inner shape representing a complementary impression of a sacrificial layer obtained from a controlled and non-contained growth of a metal on a layer; deposited on a layer 609 of gold, the layer of gold being on top of layer 629 (col 5, lines 55-65; fig. 8).

Regarding claim 6, Beerling discloses that a structural layer 632 covers the sacrificial layer ( the layer being removed to form the chamber) completely (fig. 6)

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Regarding claim 7, Beerling discloses that the inner shape of each of said chambers, of each of said feeding ducts and of each of said nozzles represents the a complementary impression from a structural layer 632 ( fig. 6)

Regarding claim 8, Beerling discloses forming a negative photoresist, applied on the sacrificial layer (col 7, lines 25-32)

Regarding claim 9, Beerling discloses that the sacrificial layer and the layer of gold are removed by means of acid bath to create the chamber and the duct 413 connected to the chamber (col 7, lines 33-60; fig. 8)

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beerling et al (US 6,592,205) in view of Lee et al (US 5,733,433)

Beerling's print head has been described above. Unlike the instant claimed inventions as per claims 10-11, Beerling fails to disclose that the sacrificial layer is made of electrolytic copper/nickel

Lee discloses an inkjet print head comprises a sacrificial pattern including an electrolytic copper/nickel film (col 7, lines 25-30)

One skilled in the art at the time the invention was made would have found it obvious to modify Beerling structure by forming a sacrificial pattern including an electrolytic copper/nickel film to form a plating window as taught by Lee (col 7, lines 29-34)

4. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (US 5,733,433) in view of Van Nice et al (6,315,393)

Lee discloses a method for forming an ink-jet print head, the print head comprises a silicon sublayer 21, plurality of resistor and a tantalum protective layer ( col 5, lines 7-10, col 6, lines 8-10) and a gold layer 42 covering the tantalum layer (fig. 4K) . The method comprises the steps of:

chemically activating said layer of gold, to promote the start of a subsequent electrodeposition of a metal using a galvanic bath and performing an electrodeposition of a metal on said layer of gold to make a sacrificial layer , obtained from a controlled and non-contained growth, parallel and perpendicular to said layer of gold (col 7, lines 15-25)

applying a photosensitive structural layer entirely covering said sacrificial layer (col 7, lines 20-25)

photoetching a plurality of nozzles 41 through said structural layer ( col 8, lines 13-17; fig. 4J)

removing said sacrificial layer by chemical etching, in the form of a highly with an acid bath to produce a plurality of chambers and of corresponding feeding ducts (col 8, lines

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1-15), each of the chambers being delimited internally by a flat bottom wall, and a concave upper surface joined uninterruptedly to the bottom wall, the bottom wall including a tantalum layer and the layer of gold, the upper surface represents a impression of the sacrificial layer ( figs. 4I-4J)

Unlike the instant claimed invention as per claim 12, Lee fails to disclose that the ink jet printhead made on a wafer divided into a plurality of die

Van Nice discloses a method for forming ink-jet printhead comprises a step of forming print head from thin die made of silicon (col 2, lines 25-30)

One skilled in the art at the time the invention was made would have found it obvious to modify Lee method by forming the print head from a die in view of Van Nice teaching because Van Nice discloses that the print head generally includes a thin film die comprising a material such as silicon (col 2, lines 25-30)

Regarding claim 13, Lee discloses a step of etching the layer 26 of gold to define a starting area (col 6, lines 14-17; fig. 4C)

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (US 5,733,433) in view of Van Nice et al (6,315,393)

Lee discloses a method for forming an ink-jet print head, the print head comprises a silicon sublayer 21, plurality of resistor and a tantalum protective layer ( col 5, lines 7-10, col 6, lines 8-10) and a gold layer 42 covering the tantalum layer (fig. 4K) . The method comprises the steps of:

chemically activating said layer of gold using a galvanic bath and performing electrodeposition of a metal using a galvanic bath and performing an electrodeposition to make a sacrificial layer, obtained from a controlled and non-contained growth, parallel and perpendicular to said layer of gold (col 7, lines 15-25)

applying a non-photosensitive structural layer covering the outer surface of the sacrificial layer 35; said non-photosensitive layer being made of polymer film (col 7, lines 20-25)

making a plurality of nozzles through said structural layer ( col 8, lines 13-17; fig. 4J)  
removing said sacrificial layer by chemical etching, in the form of a highly with an acid bath to produce a plurality of chambers and of corresponding feeding ducts (col 8, lines 1-15), each of the chambers being delimited internally by a flat bottom wall, and a concave upper surface joined uninterruptedly to the bottom wall, the bottom wall including a tantalum layer and the layer of gold, the upper surface represents a impression of the sacrificial layer ( figs. 4I-4J)

***Allowable Subject Matter***

6. Claims 14-15 allowed.

The following is an examiner's statement of reasons for allowance:

Regarding claim 14, the cited prior art of record fails to disclose or suggest a manufacturing process of an inkjet printhead comprises a step of performing planarization of an upper surface of said non-photosensitive structural layer to uncover



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an upper dome of the cast of copper, in combination with the rest of the steps/limitations of claim 14

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is (571)272-1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lan Vinh/  
Primary Examiner, Art Unit 1792

